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Promotion of renewable energy in Baltic States

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Abstract

Baltic States have quite limited own energy resources. In the accession agreement with EU Lithuania, Latvia and Estonia have verified their targets to increase the share of electricity produced from renewable energy sources (RES-E) by the year 2010. Lithuania has target to increase RES-E from 3.3 to 7%, Latvia—from 42.4 to 49.3% and Estonia—from 0.2 to 5.1%. Promotion of use of renewable energy sources are among the priorities of energy policy in Baltic States. More wide use of renewable energy can make a valuable contribution to diversification of energy supply and increase of reliability of energy supply and to meeting GHG emission reduction targets. The article presents a detailed overview of the present policies and measures implemented in Baltic States aiming to support the use of renewable energy sources. The article presents a review of the present renewable situation in Baltic States and analyses policies and measures in place aiming to enhance use of renewables. The review of possibilities to use EU structural funds for the implementation of renewable energy projects in Baltic States was performed in the paper.

Keywords: Promotion of renewable energy sources; Policies and measures to enhance use of renewable energy sources

Contents

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1. Introduction

Policies and measures implemented in Baltic States aiming to enhance use of renewable energy sources are mainly driven by EU accession requirements. Baltic States have already implemented all EU directives targeting to enhance use of renewable energy sources.

The EU white paper sets a common average target to increase the share of renewables in total primary energy supply from current 6 to 12% by 2010 and the share of electricity produced from renewables from 14 to 22%, respectively. These targets practically corresponds to the EU commitment on CO_2 emission reduction by 2012. Lithuanian National energy strategy, adopted in 2002 sets the target to reach 12% of renewables in primary energy supply up to 2010 [1]. Estonia [2] and Latvia [3] have no specific targets established for the share of renewables in total primary energy supply. Renewable energy sources in total primary supply of Lithuania made up to 8%, in Estonia—11% and in Latvia—34% in 2002.

Baltic States have quite different but ambitious targets for RES share in electricity production (comparing with the current share of renewable in electricity generation) based on the requirements of Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market (Table 1). The percentage contribution of RES-E in 1999 and 2010 are based on the national production of RES-E divided by the gross national electricity consumption. For Baltic States gross national electricity consumption is based on 2000 data.

As one can see from Table 1 Lithuanian indicative target is to double the share of RESE in year 2010 based on 1999 level. Other Baltic States have much more difficult tasks, for example Estonia has to increase electricity generation from RES by more than 25 times.

Baltic States have implemented 2003/30/EC Directive on the promotion of the use of biofuels or other renewable fuels in transport requiring that Member States must ensure by

Table 1
National indicative targets for the contribution of electricity produced from RES of Baltic States

Countries	Electricity production from RES in 1999 (TWh)	The share of RES-E in electricity consumption in 1999 (%)	In 2010 the share of RES-E in electricity consumption of 2000 level (%)
Estonia	0.02	0.2	5.1
Latvia	2.76	42.4	49.3
Lithuania	0.33	3.3	7.0

end of 2005 a 2% minimum proportion of biofuels of all gasoline and diesel fuels sold on their market. In longer term the target is to achieve a share of 5.75% of biofuels for transport in the total amount of fuels in Europe by 2010 and 20% by 2020.

2003/30/EC Directive was implemented in Baltic States by and the same targets were established—to ensure that by 31 December 2005 the share of biofuels will make not less than 2% total fuels (gasoline, diesel) consumed by motor vehicles and by 31 December 2010 not less than 5.75% [4].

2002/91/EC Directive on the energy performance of buildings sets target to realize a savings potential of around 22% by 2010 for energy used in heating, air-conditioning, hot water and lighting. This directive was implemented in Baltic States and the plans of action for the implementation of this directives were adopted in Baltic States. Use of renewables energy sources (solar collectors for hot water and heating) in public buildings can also help to implement requirements of Directive 2002/91/EC. Use of EU structural funds can be widely used for the energy efficiency improvements in public buildings in Baltic States.

2004/8/EC Directive on the promotion of cogeneration based on a useful heat demand in the internal energy market aims to increase energy efficiency and improve security of supply by creating a framework for promotion and development of high efficiency cogeneration of heat and power based on useful heat demand and primary energy savings taking into account the specific national circumstances especially climate and economic conditions. This directive was also implemented in Baltic States. Development of CHPs using biomass can be very attractive for Baltic States because high efficiency cogeneration and use of renewables provides the synergy effect on energy intensity decrease, climate change mitigation and security of supply which are the main energy policy priorities in Baltic States.

2. Review of Baltic States energy sectors

Baltic States are close in their territory and population size, climate and geographical conditions, have similar economic development patterns and political achievements during the last years but they have quite different economic and energy and power sectors' structure which has the significant impact on the size and intensity GHG emissions.

Despite the slowdown in the global economy, the three Baltic States posted an average 6.6% increase in their real gross domestic product (GDP) during the last years. With a combined population of only 7.2 million people, Estonia, Latvia, and Lithuania have achieved greater presence in the international community by joining forces in a number of political and economic arenas. In 2004 Estonia, Latvia, and Lithuania joined the North Atlantic Treaty Organization (NATO) as well as the European Union (EU).

The Baltic States are net oil importers, depending on Russia for approximately 90% of their supply. Only Lithuania has oil refinery, Mazeikiai refinery, which sells its products in all three Baltic countries and is jointly owned by the Lithuanian government and Russia's Yukos oil company. A part of Estonia's oil products (mainly shale oil used for energy generation) come from oil shale. Latvia produces no oil products domestically and is entirely dependent on imports. The region imports oil products from Russia, CIS and a small part from Western countries. The Baltic States are entirely dependent on natural gas imports to meet their domestic consumption needs. Natural gas imports come mostly from Russia.

Table 2
Installed and disposable capacity, year 2002 (MW)

	Lithuania	Latvia	Estonia
Installed capacity	6155.9	2145.3	2976.6
HPPS	800	0	0
Hydro power	113.1	1543	0
Nuclear power	2600	0	0
Thermal power	2642.8	576.6	2976.6
Condensing	1800	0	2730
CHP	842.8	576.6	246.6
Renewable power (wind)	0	25.7	0

Estonia and Lithuania are net electricity exporters, sending their surplus to neighbouring Latvia and parts of northwest Russia. In 2001, Estonia generated 7.9 billion kW h of electricity, the preponderance of which came from the country's Narva oil shale-fired power plants [5]. Lithuania generated 14.6 billion kW h in 2001, of which 11.4 billion kW h came from the Ignalina NPP, which is to be closed in two stages beginning in 2005 and ending in 2009 [6]. Latvia is the region's only net electricity importer, buying from other Baltic States as well as from Russia. The country has large hydroelectric facilities (1517 MW), but in a dry year is estimated to be only 60% selfsufficient [7]. Latvia is working with Estonia and Finland to develop the 'Estlink' project, a 315-MW underwater cable linking the Baltic States to the Scandinavian and Nordic power grids. The interconnection with Western power systems via Poland is foreseen in Lithuania. Table 2 summarizes data on installed power capacities in Baltic States.

As one can see from Table 2 just Latvia has 25.7 MW of installed wind capacities. Lithuania in 2002 has just few hydro capacities—113 MW. All three Baltic States are planning to extend use of wind power on the Baltic Sea shore were climate conditions are the most favourable for wind power development.

Information on the main economic and population data, primary, final energy and electricity consumption in Baltic States [8] is presented in Table 3.

Information provided in Table 3 allows to compare Baltic States according to the main energy indicators. As one can see from Table 3 Estonia distinguishes from Baltic States with high patterns of energy consumption per capita and high primary energy intensity of economy. Lithuania and Estonia has low energy supply efficiency comparing with Latvia. The low losses in energy supply system of Latvia are caused by dominating hydro in electricity production structure. Another important features, which can be seen from Table 3 is that final energy consumption per GDP is the highest in Latvia though primary energy consumption per GDP is the lowest in Latvia. This is also related with high final energy per primary energy supply ratio in Latvia. All three Baltic States are highly dependent on energy imports. Only Estonia has lower share of important because of its oil shale resources. Summary information on total primary energy supply structure in Baltic States [8] is presented in Table 4.

As one can see from Table 4 countries have very different total primary energy supply (TPES) structure. In Lithuania more than 40% of primary energy supply comes from nuclear. In Estonia 58% of primary energy supply is covered by oil shale. In Latvia firewood takes about 30% of total primary energy supply. In Lithuania and Estonia the

Table 3
Main economic and energy consumption indicators in Baltic State, 2002

Main data	Unit	Lithuania	Estonia	Latvia
Population	Thou. Inhabitants	3469	1359	2339
GDP PPP	Billion USD	33.20	13.7	19.58
GDP/capita	USD/cap	9570	10,114	8370
Primary energy supply	Mtoe	8.621	4.630	4.480
Final energy consumption	Mtoe	4.804	2.553	3.853
Gross electricity consumption	TW h	11.243	7.837	6.323
Final electricity consumption	TW h	6.723	5.686	4.882
Primary energy/capita	toe/capita	2.49	3.41	1.92
Final energy/capita	toe/capita	1.38	1.88	1.64
Gross electricity consumption/ capita	kW h/capita	3239	5767	2704
Final electricity consumption/capita	kW h/capita	1983	4184	2018
Primary energy per GDP unit	toe/thou USD PPP	260	338	229
Final energy per GDP unit	toe/thou USD PPP	145	185.8	196
Gross electricity consumption per GDP at PPP	kW h/thou USD	339	572	314
Final electricity consumption per GDP at PPP	kW h/thou USD	203	415	196
FEC/TPES	%	55.7	55.0	85.6
Net import share in balance	%	43.8	30.7	65.6

Table 4
TPES structure in Baltic Sates in 2002

TPES structure (%)	Lithuania	Latvia	Estonia
Oil products	28.7	29.3	20.1
Natural gas	25.2	29.1	11.1
Coal	1.6	1.6	0.9
Peat	0.2	0.7	2.8
Oil-shale	–	1.1	53.8
Firewood	7.8	29	10.9
Hydro	0.3	4.8	0.2
Nuclear	42.8	–	–
Net import of electricity	−6.6	4.4	−0.3
TPES (ktoe)	8621	4480	4630

share of firewood is twice lower. Latvia and Lithuania have similar shares of oil products and natural gas supply. Estonia because of oil shale has lower shares of natural gas and oil products in the primary energy supply. The share of renewables in Latvian TPES exceeds 33% mainly because of firewood use. Hydro makes 5% in TPES of Latvia. The lowest share of renewable energy sources is in Lithuania—8%. The main renewable energy source in Lithuania is also biomass. The similar situation is in Estonia where renewable energy sources (mainly firewood) makes more than 11% of TPES. Final energy consumption structure according sectors in Baltic Sates is presented in Table 5.

The highest share of final energy being consumed by manufacturing is in Estonia. The Latvia and Estonia have lowest energy consumption share in manufacturing comparing with Lithuania therefore this could make positive impact on energy intensity of economy.

Table 5
Final energy consumption structure in Baltic Sates in 2002

Final energy (%)	Lithuania	Latvia	Estonia
Manufacturing	32.3	21.0	19.7
Transport	25.5	23.8	17.9
Household	29.7	38.2	46.7
Agriculture	2.3	2.3	4.1
Commercial	10.2	14.7	11.6
Final energy consumption (ktoe)	4685	3852	2553

In Latvia and Estonia the biggest final energy consumer is household sector. Manufacturing which is the most energy intensive sector has the highest share of GDP in Lithuania. Commercial sector, which has the low energy intensity, gives the biggest share of GDP in all countries. This has positive impact of energy intensity of economy.

3. Policies and measures promoting use of RES in Baltic States

Baltic States have very similar policies in measures in place to promote use of renewable energy sources or having impact on renewable energy source utilisation: pollution taxes, fuel taxes, VAT and excise tax allowances for biomass and biofules, feedin prices for electricity produced from renewable energy sources, GHG emission trading schemes to be implemented since January 2005. Estonia distinguishes from Baltic States with voluntary green certificate trading system and CO_2 tax implemented recently.

3.1. *Value added tax (VAT)*

Since 2004 Lithuania and Estonia have the same VAT rate applied for households district heating. Latvia has no VAT applied for district heat for households. Before 2004 Lithuania had the highest VAT rate being applied for district heating—8%. Latvia is planning to introduce VAT (18%) from 01.07.2005. This reduced tax rate for district heating can be treated as subsidy, which in general is environmentally harmful because district heat can be produced from carbon intensive fuels, for example HFO, orimulsion or oil-shale. In general reduced VAT rate for district heating causes distortions in energy market because it puts into the worse position decentralized heat supply. The best solution is to reduce subsidies for fossil fuel based energy sources and provide social support directly to the most vulnerable groups of population because in current situation all people receive subsidy but not only poorest one. VAT rates in Baltic States are presented in Table 6.

As one can see from Table 6 Lithuania is the only country from Baltic States which apply VAT exemptions from biofuels [9]. This has positive impact on promotion of biofuels use in transport sector and implementation of requirements of Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels in transport. Estonia applies the reduced VAT for peat and briquette, coal and wood sold to private consumers.

Table 6
Rates of VAT applied in Baltic States

Value added tax	Lithuania		Estonia		Latvia	
	Rate	New rate	Rate	New rate	Rate	New rate
Standard rate	18%	–	18%	–	18%	–
Heating services for households	9%	5% since October 2004	5%	18% (01.07.2007)	0%	18% (01.07.2005)
Burning peat and briquette, coal and wood sold to private consumers	18%	–	5%	18% (01.07.2007)	18%	–
Denaturised dehydrated ethyl alcohol and methyl and ethyl ester produced from rapes	9%	0% since January 2003	–	–	–	–

Table 7
Pollution taxes for emissions into atmosphere in Baltic States in 2004 (EUR/t)

	CO_2 tax (EUR/t)	Tariffs (EUR/t)		
		SO_2	NO_x	Particulates
Estonia	0.7	8.8	20.1	8.8
Latvia	0.15	19.5	19.5	6
	Since 07.2005	45 since 07.2005	45 since 07.2005	
Lithuania		62.8	107.7	53.7

3.2. Pollution taxes

Baltic States have quite different pollution tax rates applied for stationary pollution sources (Table 7). Pollution taxes have impact on enhanced use of renewable energy sources because renewable energy sources do not emit such pollutants like SO_2, CO_2 etc. into atmosphere and high taxes on emissions of these pollutants increase competitiveness of renewables in electricity, heat and transport fuels markets. The highest pollution tax rate is being applied in Lithuania. Lithuania has pollution taxes exemptions for biofuels used in mobile pollution sources.

Estonia has CO_2 tax, which is not available in other Baltic States at present. CO_2 tax in Estonia is being applied for combustion installations involved in GHG emission trading scheme. Latvia is going to introduce this tax since 07.2005 on those combustion sources which are not included in emission trading scheme; additionally the high CO_2 tax will be introduced for those combustion sources which emitted CO_2 emissions but not included them in the emissions' quota which has to be annually reported by the facility to the national authority (it will work like a penalty for facilities which will exceed their allowances). In Lithuania there are attempts to implement CO_2 tax in sectors not covered by emission trading, namely in transport sector.

3.3. Excise taxes

2003/96/EC Directive restructuring the community framework for the taxation of energy products and electricity aims to impose taxation of energy products and electricity since January 1 2004 based on minimum levels established by directive. 2003/96/EC Directive sets minimum levels of taxation applicable to motor fuels, reduced levels of taxation applicable to motor fuels used for agricultural, horticultural and forestry, stationary motors, machinery used in construction, vehicles for use of public roadway and minimum levels of taxation applicable to heating fuels and electricity. The minimal rate of taxation was established based on calorific value of fuels except of motor fuels. The EU member states received permits to apply reduced rates and some exemptions with regards of requirements set by directive. The implementation of this directive have positive impact on enhanced use of renewable energy sources because in Baltic States biofuels and biomass are exempted from excise taxes.

Baltic States have transition period for the harmonization of their excise taxes according requirements of 2003/96/EC Directive restructuring the community framework for the taxation of energy products and electricity. In general excise taxes are very similar in Baltic

Table 8
Excise taxes in Baltic States in 2004

Type of energy	Unit	Latvia	Estonia	Lithuania
Gasoline leaded	EUR/1000 l	392	340	421.2
Gasoline unleaded	EUR/1000 l	268	290	287.04
HFO	EUR/t	14	10	15
Kerosene, diesel	EUR/1000 l	228	250	292
Heating oil	EUR/1000 l	20	26.84	21.02
Liquefied petroleum gas and gaseous hydrocarbons	EUR/t	117	100	126

States. For example excise tax for unleaded petrol is in Estonia is 288 EUR/1001, in Latvia—268 EUR/10001 and in Lithuania—287.04 EUR/10001, respectively. All Baltic States have transition periods to achieve minimal requirement—359 EUR/1000 l set by Directive 2003/96/EC (Table 8). Latvia has the lowest excise tax on diesel—228 EUR/t. The minimal rate for diesel of 330 EUR per 10001 diesel—has to be implemented in Latvia till the year 2013, and this is the longer transition period among all new EU member countries.

3.4. Feed-in prices for electricity produced from RES

Baltic States have feed-in prices for renewables but schemes operate in quite different ways. In Latvia and Estonia feed-in prices for renewables are based on average price of electricity sold in previous years and the same coefficients being applied for purchasing price increase for all types of renewables, although Latvia applies higher coefficient (2) than Estonia (1.8). It has to be noted that Latvia has stated the restrictions on power plant's capacity and its commencing time to receive such support.

Latvia has stated this doubled tariff only for small scale hydro and wind plants (with capacity less than 2 MW) in case the operation of these plants and their equipment is commenced prior to 1 January 2003 (hydro plants) or 1 June 2001 (wind plants), and such support is available for the 8 years from the commencement of operation of each respective power plant. After this period the Regulator shall determine the purchase price. Also the Regulator is determining the purchase price for stations, which are put into operation after the data mentioned before. For the small scale power plants with capacity less 7 MW and using as a fuel municipal waste or the products of it processing (biogas), which will be commenced before 01.01.2008, the purchase price corresponds to the average electricity sales tariff. For any other types and capacities of power plants using renewable, different from those described before, the electricity purchase tariff is determined by Latvian Regulator.

Lithuania has fixed feed in prices set for different types of renewable. The highest price is being applied for wind energy. For small hydro and biomass the same tariff is used [10]. The summary of feed-in prices for Baltic States is presented in Table 9.

As one can see from Table 9 the highest feed-in tariffs are available in Latvia. Latvia is the only country between Baltic States which has feed-in tariffs for electricity produced by CHP. If the excess electricity is purchased from the co-generation plants with electric capacity <0.5 MW:

- For indigenous fuels the average price (4.658 EURcents/kW h) is multiplied by 1.12;
- For imported fossil fuels the average price is multiplied by 0.9.

Table 9
Feed-in prices in Baltic States in 2001 (EURcents/kWh)

RES source	Latvia (1996)	Estonia (2003)	Lithuania (2000)
Hydro power plants	9.316 (for plants <2 MW, commenced before 01.01.2003)	4.86	5.8
Wind power plants	9.316 (for plants <2 MW, commenced before 01.06.2001)	4.86	6.4
Power plants, using biofuel	(1) 4.658 (for plants <7 MW using municipal waste or biogas commenced before 01.01.2008) (2) determined by the regulator	4.86	5.8

From the co-generation plants with electric capacity 0.5 MW<4 MW:

- For indigenous fuels the average price is multiplied by 0.95;
- For imported fossil fuels the average price is multiplied by 0.75.

3.5. GHG emission trading scheme

2003/87/EC-Directive on establishing a scheme for GHG emission allowance trading within the Community foresees that Member States shall start CO_2 emission trading among combusting installations with a rated thermal input exceeding 20 MW, mineral oil refineries, coke ovens, ferrous metals processing installations, mineral industry, pulp and paper producing installations by issuing certain amount of tradable emission permits free for 2005–2007 period according the National allocation plans to be adopted by Commission. The implementation of this directive will have positive impact on enhanced use of renewable energy sources because electricity and heat production from renewables does not require tradable GHG emission permits.

All Baltic States have implemented GHG emission scheme since January 2005. Countries have different Kyoto targets, different current GHG emission levels and different structure of power generation sources consequently the total amounts allocated per country and for energy enterprises differs quite significantly. Table 10 summarizes the data from NAP (National Allocation Plans) submitted to EC in September 2004 and corrected after consultations with EC [11].

For the first trading period the highest allocated amount of tradable allowances is defined in Estonian national allocation plan (56.86 Mt) though total GHG emissions in Lithuania were higher in 1990 and 2001 years, respectively. This is related with high GHG emission share being attributed to fuel combustion sector in Estonia, especially for energy transformation sector. GHG emissions from energy transformation sector in Estonia in 2001 amounted to 87% of total GHG emissions. At the same time in Lithuania GHG emissions amounted to 30% and in Latvia to 23% of total GHG emissions, therefore, the total allocated amount of tradable permits in Latvia is about five times lower comparing with Estonia though GHG emissions in Latvia in 1990 were only by 1.5 times lower than in Estonia.

Table 10
GHG emissions, Kyoto targets, current pollution level and allocated amounts according NAPs in Baltic States

1990	Kyoto limit	2001	Allocated amount in 2005–2007	Allocated amount after requirement of EC to reduce earlier allocated amount
Latvia	29.1 Mt	26.8 Mt	11.18 Mt (in emission trading sector—3.7 Mt)	13.73 Mt or 4.58 Mt 12.24 Mt per year
Lithuania	54.6 Mt	50 Mt	20.6 Mt (in emission trading sector—7.3 Mt)	40.696 Mt or 13.5736.796 Mt per year
Estonia	43.5 Mt	40 Mt	19.43 Mt (in emission trading sector—14.6 Mt)	62.84 Mt or 20.9456.86 Mt per year

3.6. Voluntary measures

Estonia is the only country among Baltic States having the voluntary green certificate trading (GCT) system. The system of green certificate trading implemented in Estonia has some differences comparing with schemes implemented in other EU Member States. The main difference is that the scheme is voluntary and there are no legal binding obligations for consumers to buy established amount of Green certificates.

Roheline energia (green energy) in Estonian is brand name and identifies energy produced mostly by small independent generators from water and wind, and which is bought by Eesti Energy and resold on the local market. The brand has been developed and marketed by Estonian fund for nature, whose mission is the protection of hereditary values of the Estonian nature and the promotion of sustainable development.

The Green Energy Use's Certificate verifies that its owner has made a monetary contribution to cover the purchase and marketing costs of a certain annual amount of renewable energy and donation to the amount of 10 Estonian cents (EUR 0.0034) per kWh to the Estonian Fund for Nature for the financing of its priority activities. The potential profit from the sales of green energy certificates will be allocated to a special fund established by Eesti Energia. More than 90% of electricity consumed in Estonia is produced by Estonian Energy. It is state owned power production, transmission and distribution company. The energy produced from renewable amounted to 0.5% of the country's total energy production. The allocations will be used for financing the projects related to the development of the production, distribution and supply of energy produced from renewable. The total annual amount of Green energy indicated on the issued certificates shall not exceed the annual amount of renewable energy sold to Eesti Energia. Supported by Green energy consumers Estonian Energy has renovated Country's biggest hydropower plant, Linammae. The plant's designed capacity is 1 MW and its annual energy production is estimated to be 70,000 MW h per year. Estonian Energy also owns and operates 1 of 3 600 kW wind turbines in Virtsu Windpark. Certificates have such specifications:

- *Green energy I category*: certificates shall be issued to legal entities which annual power consumption is over 600,000 kW h. This certificate provides that the owner shall by 120,000 kW h of renewable energy a year;

- *Green certificates II category*: certificates shall be issued to legal entities which annual power consumption is over 300,000 kW h. This certificate provides that the owner shall by 60,000 kW h of renewable energy a year;
- *Green certificates III category*: certificates shall be issued to legal entities which annual power consumption is over 30,000 kW h. This certificate provides that the owner shall by 6000 kW h of renewable energy a year;
- *Green certificates IV category*: certificates shall be issued to for residential customers and proves that is owner shall buy 1200 kW h of renewable energy in a year.

All the certificates are valid for 12 calendar months and include 0.1 EEK per kWh donation to Estonian nature foundations. Legal entities which annual power consumption is over 300,000 kW h. This certificate provides that the owner shall by 60,000 kWh of renewable energy per year.

The system is quite simple transparent and easy to implement. The voluntary TGC scheme can also be implemented in Latvia and Lithuania but as Latvia has quite huge share of hydro in electricity generation and implementation of voluntary green certificate trading is more important for Lithuania because of it is current low share of electricity produced from renewable (3.1% in 2002). European-wide TGC scheme might be also in 1998–2010, following a report and a proposal from the European Commission in 2005. High efficiency cogeneration can also be enhanced via TGC scheme.

3.7. Use of structural funds for promotion of RES projects

Structural funds are the European Union's main instruments for supporting social and economic restructuring across the Union. They account for over a third of the European Union total budget. There are four structural funds, which contribute to the economic development of disadvantaged regions. The European Regional Development Fund aims to improve economic prosperity and social inclusion by investing in projects to promote development and encourage the diversification of industry into other sectors and areas lagging behind. Support from this fund can be very useful in promoting renewable energy sources in Baltic States. For the period between 2004 and 2006, €22 billion have been earmarked for all structural instruments in the 10 countries acceding to the EU on the 1 May 2004. The Treaty of Accession provides that the acceding countries may benefit from the eligibility of expenditure under structural funds as of 1 January 2004 where all the conditions laid down in the structural funds and cohesion fund regulations are fulfilled. These conditions concern full compliance with the implementation rules for the structural and cohesion funds, as well as with Community policies and legislation in areas ranging from environmental protection, public procurement, elimination of inequalities, transport policy to competition and state aid.

All Baltic States have adopted single programming documents for 2004–2006 which establishes the main strategic directions of EU structural funds use in Baltic States. Lithuanian Common programming document and its supplement for 2004–2006 establishes the main priorities, operational programmes and aims of structural funds use in Lithuania [12]. The Lithuanian single programming document (SPD) is being implemented by specific strategies described in five operational programmes (OP). Sustainable energy projects can be implemented using the schemes from the first operational programe: 'Development of Infrastructure'. The following priorities of OP 1

Measure 1.2 ‘Ensuring of Energy Supply Stability, Accessibility and Increased Energy Efficiency’ are related to enhanced use of renewable energy sources in Lithuania:

- *Priority ID 1–2.2*: Renovation of boilers and biomass or natural gas conversion;
- *Priority ID 1–2.3*: local and renewable energy sources (RES);
- *Priority ID 1–2.4*: Increase of energy efficiency (EE) in public sector;

As regards investors preparing projects resulting in increased energy efficiency, energy savings or use of renewable and secondary sources, the possibility to acquire assistance through structural funds (SF) is primarily orientated to the Measure ID 1.2. The main objective of Measure 1.2 is to ensure stability, reliability, flexibility and accessibility of energy supply, increase of energy efficiency and to form a basis for the stable growth of national economy. Particular subgoals relating to EE or renewable energy sources (RES): renovation of boilers and switching to other fuels in the combustion plants currently burning less environmentally friendly fuels (especially burning high sulphur content petroleum products); increase the use of RES; increase of EE in public sector.

Eligible projects are related with reduction of negative impact on environment; increase of reliability of energy supply; use or promotion to use RES; increase of energy use efficiency; implementation of advanced technologies. The funds allocated for Priority 1.2 in Lithuania 2004–2006 makes €82.76 million. The funds which have been distributed up to 01.01.2005 for 3 projects makes €1.24 million. All these projects were aiming on energy efficiency increase in buildings in public sector.

There is no direct support activity in single programming document for renewables in Latvia [13]. In indirect way it is possible to support RES under the operational programme 2 ‘Promotion of Business Sector and Innovation’ with a Community contribution of €156.4 million. The aims of OP 2 are the following:

- Supporting development of innovation and business infrastructure,
- Business support to small and medium-sized enterprises as well as facilitating their access to finance,
- Development of public research.

The support to renewable energy projects under this operational programme can be provided only indirectly as support for projects increasing competitiveness of enterprises by implementing new technologies which has positive impact on pollution reduction, energy efficiency increase etc. Promotion of renewable energy sources in municipalities heat supply system has to be expressed in more emphasised way in the next programming document for 2007–2013. Support from structural funds in Latvian SPD OP 4 ‘Development of rural areas and fisheries’ (€115 million) is limited by the forestry sector and biomass use. In the next financing period the support measures should be extended by including other types of renewables and measures to increase energy efficiency.

In Estonian single programming document 2005–2007 [14] he renewable energy projects can be directly supported from OP 4 ‘Infrastructure and local development’ (Community contribution of €138 million) Measure 4.2 ‘Development of Environmental Infrastructure’.

The specific objectives of the measure are:

- Achieving a good status of surface waters and groundwater;
- Reducing the environmental impact of the energy sector, improving efficiency and increasing the share of renewable energy;
- Prevention and reduction of waste production, together with the related health and environmental hazards;
- Preservation of biological and landscape diversity.

In Estonia renewable energy projects can be financed directly from this measure. This measure fosters the use of renewable energy sources like biomass, wind and small hydro, which gives rise to decentralization of the electric power production and reduces the use of fossil fuel sources that helps to save the environment and implement requirements of Directive 2001/77/EC on electricity from renewable energy sources. Biomass activities are of special importance for Estonia due to its significant forest potential and due to the fact that 25% of agricultural land is unused in this country. Energy crops and afforestation of abandoned land could mitigate the underemployment problem in rural areas and generate a sustainable energy. They will also contribute to the production of liquid biofuels in line with Directive 2003/30/EC.

The eligible project schemes under this measures can be: introducing renewable energy (for example, some forms of hydro-electric power, wind, biomass, etc. In projects where investments are the lowest or where the cost price of production would not support the project's viability; emphasis is based on increasing the share of energy produced by renewable sources.

4. Conclusions

1. Three Baltic States have very different energy sectors, different situation of renewable energy use and quite similar policies and measures to promote use of RES which are mainly driven by EU accession.
2. Estonia distinguishes from Baltic States with high patterns of energy consumption per capita, carbon intensive structure of TPES and high energy and carbon intensity of economy. The main renewable energy sources in Baltic States are firewood and hydro. Latvia has the highest share among Baltic States of RES in TPES (mainly firewood) and in electricity production (mainly hydro).
3. Comparing tax policies in Baltic States one can notice that Lithuania has the highest pollution taxes per tonne of pollutant emitted from stationary pollution sources (SO_2 tax applied in Lithuania is seven times higher than in Estonia though Estonia has problems with oil-shale burning) and countries have similar GDP/capita adjusted at PPP. Only Estonia has CO_2 tax for combustion sources implemented in 2001. Latvia is going to introduce this tax on combustion sources since July 2005. In Estonia CO_2 tax is being applied for combustion sources with capacity over 50 MW and these sources will also be included in GHG emission trading scheme. Latvia is going to introduce CO_2 tax on sources do not included in GHG emission trading scheme therefore completely different approaches are being applied in Baltic States.
4. There are differences in VAT being applied for district heat in Baltic States. Estonia and Lithuania have applied reduced VAT rate of 5% for district heat supplied to

households since 2004. Latvia have no VAT tax on DH supplied to households and are planning to introduce this tax just starting from the middle of 2005.

5. Latvia has the lowest excise taxes on fuels. Especially low tax rate and long transition period was granted for diesel (up to 2013). Lithuania and Estonia have the similar excise tax rates for gasoline but quite different for diesel.
6. All countries have prepared National allocation plans and submitted them to EC in time. Allocated amounts differ because of the differences in energy sector generating structure and consequently GHG emissions arising from this sector. The total allocated amount of tradable allowances is the highest in Estonia.
7. Baltic States have some direct support measures for renewable. Lithuania has excise and VAT exemption for biofuels. Estonia has excise and VAT exemptions just for biomass.
8. All countries implemented feed-in prices to support renewable but the structure of scheme and rates are different. Latvia and Estonia have quite similar support scheme where the fixed and common coefficient to increase the purchasing price (based on average sale price of electricity in the country) of electricity produced fromall renewable is used. Estonia uses the lower coefficient than Latvia to promote use renewable by feedin price. Lithuania has established fixed feed-in tariffs for wind, biomass and small hydro but for the wind energy the higher feed in prices were used than for biomass and hydro.
9. Comparing feed-in prices in Baltic States one can noticed that highest support to renewable is being applied in Latvia (almost twice higher than in Estonia). Latvia has introduced the restrictions on power plant's capacity and its commencing time to receive such support. The lowest feed-in prices are in Estonia but Estonia has implemented voluntary 'green certificate trading'.
10. Only Latvia has feed-in tariffs for electricity produced from CHP. Different feed-in prices are being applied based on the capacity of generation source and type of fuel used (local or imported). The higher tariff is being applied for lower capacity generating sources and for imported fuels as well.
11. Implementation of EU-wide green certificate system instead of local feed in prices applied for electricity produced from renewables would have the positive impact on deployment of renewable energy technologies and will decrease the burden on economy caused by feed-in prices.
12. The attention has to be paid for the application of EU structural funds for renewable energy projects in Baltic States. Baltic States have very different opportunities established in their SPD for the financing of renewable energy projects using EU structural funds. Priorities established by single programming documents inBaltic Sates, especially in Latvia have to be extended by including more opportunities for financing renewable energy projects from EU structural funds because development of renewables can strengthen social cohesion in EU, increase employment and economic development, reduce impact on environment and mitigate climate change.

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